

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 20 DEC 2005

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Applicant's or agent's file reference BWO6117-GC	<b>FOR FURTHER ACTION</b> See Form PCT/PEA/416	
International application No. PCT/IB2004/003173	International filing date (day/month/year) 29.09.2004	Priority date (day/month/year) 03.10.2003
International Patent Classification (IPC) or national classification and IPC G01L1/12, G01L9/00, G01K13/08, G01L1/00		
Applicant C.R.F. SOCIETÀ CONSORTILE PER AZIONI et al.		

- This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 9 sheets, including this cover sheet.
- This report is also accompanied by ANNEXES, comprising:
  - ☐ sent to the applicant and to the International Bureau) a total of sheets, as follows:
    - ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
    - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
  - ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

- This report contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand 22.07.2005	Date of completion of this report 21.12.2005
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Mucs, A Telephone No. +31 70 340- 

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**Box No. I Basis of the report**

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
  - ☐ publication of the international application (under Rule 12.4)
  - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

**Description, Pages**

1-15 as originally filed

**Claims, Numbers**

1-28 as originally filed

**Drawings, Sheets**

1/6-6/6 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing *(specify):*
  - ☐ any table(s) related to sequence listing *(specify):*
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing *(specify):*
  - ☐ any table(s) related to sequence listing *(specify):*

\* If item 4 applies, some or all of these sheets may be marked "superseded."

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**Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:
- ☐ the entire international application,
  - ☒ claims Nos. 11
- because:
- ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):
  - ☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):
  - ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
  - ☒ no international search report has been established for the said claims Nos. 11
  - ☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:
    - the written form ☐ has not been furnished
    - ☐ does not comply with the standard
    - the computer readable form ☐ has not been furnished
    - ☐ does not comply with the standard
  - ☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-bis of the Administrative Instructions.
  - ☐ See separate sheet for further details

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**Box No. IV Lack of unity of invention**

1. ☒ In response to the invitation to restrict or pay additional fees, the applicant has:
- ☐ restricted the claims.
  - ☒ paid additional fees.
  - ☐ paid additional fees under protest.
  - ☐ neither restricted nor paid additional fees.
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is
- ☐ complied with.
  - ☒ not complied with for the following reasons:  
**see separate sheet**
4. Consequently, this report has been established in respect of the following parts of the international application:
- ☐ all parts.
  - ☒ the parts relating to claims Nos. 1-10,12-28 .

**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	2-9,12-28
	No: Claims	1,10,24
Inventive step (IS)	Yes: Claims	5-8,12,13,16-20,22,23,26,27,28
	No: Claims	1-4,9,10,14,15,21,24,25
Industrial applicability (IA)	Yes: Claims	1-10,12-28
	No: Claims	

2. Citations and explanations (Rule 70.7):

**see separate sheet**

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**Re Item III.**

**Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

Lack of unity of invention. The first and third subjects have been searched. Only for these searched subjects a written opinion will therefore be given.

**Re Item IV.**

**Lack of unity of invention**

Reference is made to the following documents:

D1 : US 6 507 187 B1 (OLIVAS JOHN D ET AL) 14 January 2003 (2003-01-14)

D2 : US 6 476 113 B1 (HILES MAURICE) 5 November 2002 (2002-11-05)

D3 : EP 0 650 139 A (ENIX CORPORATION) 26 April 1995 (1995-04-26)

D4: Annual Applied Power Electronics Conference, New York, 9 Feb. 2003,  
Olson et al, Integrating giant magnetoresistive current and thermal sensors

The separate inventions/groups of inventions are:

**1. Claims 1-10,12,13,24-26**

a pressure sensor with a plurality of layers , at least one magnetic layer and a compressible layer. A process for manufacturing the same and a method to detect pressure.

**2. Claim 11**

a magnetic sensor associated to a pressure monitoring system of a tyre

**3. Claims 14-23,27,28**

a temperature sensing device with a plurality of layers,

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at least one magnetic layer a process of manufacturing the same and method to detect temperature.

The present application lacks unity within the meaning of Rule 13(2) of the PCT for the following reasons:

Document D1 (US6507187) discloses all the features of claim1 (a magnetic transduction sensor with at least one magnetic layer and a plurality of layers in a stack )  
Over this state of the art the potential special technical features claimed in the application are related to:

1. subject: (claims 2-10,12,13,24-26)

problem solved: a pressure sensor comprising a compressible layer  
reducing fragility, easy to obtain, higher sensitivity

2. subject: (claim 11) a tyre pressure monitoring system with controller and actuators  
for blowing air into the tyre

problem solved: automatic pressure control for a tyre

3. subject: (claims 14-23,27,28)

problem solved: a temperature sensor comprising a magnetic layer  
miniaturization

Apart from the state of the art no same or corresponding technical features can be found between the above groups of claims.

There is thus no technical relationship between the special technical features defined for each of these groups of claims and ,  
therefore , none of the alleged inventions defined in these groups of claims are linked by a common general inventive concept.

**Re Item V**

**1. Novelty**

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT.

1.1 Document D1 discloses (the references in parentheses applying to this document):

A magnetic sensor comprising at least one magnetic layer (30) configured to determine a variable magnetisation (MF) in response to the variation of pressure, characterised in that said device comprises a plurality of layers (110-180) said magnetic layer (30) interacting magnetically through said variable magnetisation (MF) with a free magnetic layer (130), able to be associated with a temporary magnetisation (MT), said free magnetic layer (130) belonging to said plurality of layers (110-180), which further comprises at least one spacer layer (150) and a permanent magnetic layer (140) associated to a permanent magnetisation (MP).

Claim 1 is thus not novel.

1.2 D1 also discloses a spin valve as a result of the stacked layers (Column 5, line 6, figure 2), thus claim 10 is not novel.

1.3 D1 also discloses a detection process of a physical quantity by magnetic transduction (see claim 1), thus claim 24 of the current application is not novel.

**2. Inventive Step**

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 2-4, 9, 14, 15, 21, 25 does not involve an inventive step in the sense

of Article 33(3) PCT for the following reasons:

2.1 Claim 2 describes a compressible layer associated with the plurality of layers which is not known from D1. A compressible layer between a magnetic layer and a magnetic sensor is however known from D3 and it would be common practice for the person skilled in the art to combine this knowledge to solve the problem of fragility and easier production of the membrane. Claim 2 therefore does not meet the requirements of the PCT in respect of inventive step.

Claim 3 describes the location of the compressible layer between the magnetic layer and the free magnetic layer which is not inventive for the same reasoning as for claim 2

Claim 4 describes the thickness of the compressive layer being such that it prevents the switching of the free magnetic layer. This is known from D3 (see col.9 line 5 -20) the switching function being interpreted as corresponding to pressure applied or not (groove portion of the finger tip) thus claim 4 does not involve an inventive step.

D3 describes a compressible member made of an "elastomer such as a sponge sheet" which has been interpreted as having porous qualities as claimed in claim 9, thus in combination with the sensing device of D1 claim 9 does not involve an inventive step. Claim 14 does not involve an inventive step as D4 discloses the use of a stacked GMR sensor for temperature sensing.

Claim 15 is disclosed in D1, see the layer structure (110-180).

Claim 21 is disclosed in D1.

Claim 25 does not involve an inventive step for D3 discloses a pressure sensor with the detection steps of realizing a compressible layer (column 8, line 55- 56) with an uncompressed thickness exceeding a threshold thickness below which the magnetic layer influences the magnetic field sensor (see column 6, line 27-40) while D1 discloses the steps of measuring the resistance of a GMR sensor as a function of displacement of the magnetic layer (see column 2, line 54-56)

2.2 Claim 5 being dependent on claim 4 is novel and inventive as neither D1 or D3 or their



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combination teach the use of magnetic particles in a resilient matrix of a magnetic layer.

2.3 The further features of claims 16-19, 22,23 and 26 to 28 are novel and inventive as they are not obviously obtainable from or disclosed in the documents D1-D4

### **3. Clarity**

Claim 12 and 13 do not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claims attempt to define the subject-matter in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result. In this case the use of the term " manufacturing process of a pressure sensor as claimed in claim1 through 9" without indicating the steps of the process does not deliver the sensor as claimed. Beside of the above clarity objection the deposition method for the compressible layer is novel and inventive when used as part of the steps to produce the sensor as claimed.

In Claim 27 the term ".....assumed by the pressure (T)" has been read as "..temperature (T)." and is obviously a typing error.